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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,518	12/21/2001	Kenneth S. Murphy	MP-332	2151

7590 02/27/2003
Mr. Edward J. Timmer
Walnut Woods Centre
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Kalamazoo, MI 49009

EXAMINER

MCNEIL, JENNIFER C

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/024,518

Applicant(s)

MURPHY, KENNETH S.

Examiner

Jennifer McNeil

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7,13-15 and 19 is/are rejected.
- 7) ☒ Claim(s) 2-6,8-12 and 16-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: Page 3, line 21 has the term "20Y40HfZr". Should this be -20Y40HfZrO--?

The sentence bridging pages 3-4 of the specification is confusing. Should -and—be present after "can" in the last line on page 3?

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 recites the limitation "the article" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 1, 7, and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Harrington et al (US 4,645,716). Harrington et al teach a flame spray material used for forming coatings articles that are suitable for use under thermal stress conditions. Harrington teaches that typical applications include turbine engine components (col. 5, lines 39-52). The coating comprises zirconium oxide, yttrium oxide, and may include up to 10% hafnium oxide (col. 4, lines 49-62).

Regarding claim 7, the substrate a metal such as a nickel alloy (col. 8, lines 17-20).

Regarding claim 14, it is highly desirable that the coating is applied over an intermediate layer of metallic bond coat to achieve optimum bond strength (col. 5, lines 16-20).

It is the examiner's position that Harrington teaches that hafnia may be present at levels above typical impurities. The range of impurities is considered about 1-2 wt%, as defined in the instant specification on page 2, line 21. Furthermore, it is fully expected that a level of hafnia higher than a typical impurity level will result in a coating with a lower thermal conductivity when compared to a coating with only an impurity level of hafnia present. Regarding the term "stabilized zirconia", it is the examiner's position that while an unstabilized zirconia is initially used, upon combination with yttria and heat from deposition, the zirconia will be stabilized. Furthermore, example 3 teaches the use of a stabilized zirconia (col. 7, lines 49-57).

Claims 1, 7, and 13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Bruce (US 6,352,788). Bruce teaches a thermal barrier coating for components used in turbine engines. The coating comprises zirconia stabilized with 1-6 wt% yttria, and further stabilized with 1-10 wt% hafnia (col. 3, lines 38-45). Bruce teaches that the hafnia has a lower coefficient of thermal conductivity than zirconia, and therefore helps improve the thermal insulating effect of the ceramic layer (col. 3, lines 51-55).

Regarding claim 7, the substrate is metallic such as a nickel superalloy (col. 3, lines 20-29).

Regarding claim 13, the component may be a turbine blade (col. 3, lines 10-12).

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Regarding claim 14, a bond coat may be used between the substrate and the ceramic layer (col. 3, lines 29-37).

It is the examiner's position that Bruce teaches that hafnia may be present at levels above typical impurities. The range of impurities is considered about 1-2 wt%, as defined in the instant specification on page 2, line 21. Furthermore, it is fully expected that a level of hafnia higher than a typical impurity level will result in a coating with a lower thermal conductivity when compared to a coating with only an impurity level of hafnia present.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington et al (US 4,645,716) in view of Bruce (US 6,352,788). Harrington teaches a flame spray material as discussed above, and teaches that the material may be used as a coating for components in gas turbine engines, such as shrouds. Harrington does not specifically mention a turbine blade or vane. Bruce teaches a ceramic coating for coating of turbine engine components such as a blade or shroud (col. 3, lines 1-5). It is the examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to use the flame spray material of Harrington on a turbine engine component such as a blade, since the blade is a component of a turbine engine that is heavily exposed to wear and corrosion and is in need of protection from hostile environments, as taught by Harrington.

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Allowable Subject Matter

Claims 2-6, 8-12, and 16-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach or give motivation to make or use a ceramic thermal barrier coating wherein at least a portion of the coating comprises a stabilized zirconia coating including hafnia in an amount effective to reduce thermal conductivity of the thermal barrier coating as compared to a similar coating having an impurity of hafnia, wherein hafnia is present in an amount of at least about 15 wt% of the coating. The prior art does not teach or give motivation for increasing the levels of hafnia to at least about 15 wt%.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer McNeil whose telephone number is 703-305-0553. The examiner can normally be reached on Monday through Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 703-308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer McNeil
Examiner
Art Unit 1775



JCM
February 24, 2003